St Joseph's School
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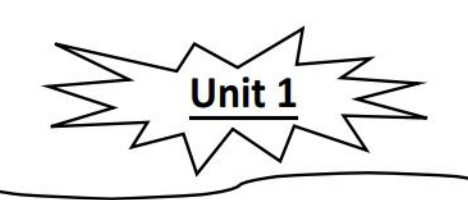
Maths Department

6^{th} Primary
2^{nd} term

Name: ....

Class: ....





The set of integers (Z)

- The set of integers is denoted by Z : and is formed from the set of positive integers , the set of negative integers and the set of zero
- $Z = Z^{+} \cup \{ 0 \} \cup Z^{-}$
- $Z^{+} \rightarrow$ the set of positive integers = { 1 , 2 , 3 , 4 , ..} and lies on the right of the zero .
- Z^{-} = { -1 , -2 , -3 , -4 , ...} and lies on the left of the zero .

Notes :

1) The number zero is neither positive nor negative number .

2- The set of integers is an infinite set .

3- $Z = N \cup Z^{-}$.

4- $Z^{+} \cup Z^{-} = \emptyset$.

5- $Z - N = Z^{-}$.

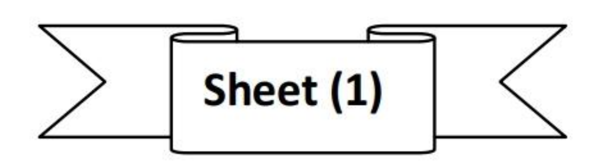
6- $N - Z = \emptyset$.

7- The set of non - negative integers = { 0 , 1 , 2 , ...} = $\{0\} \cup Z^{+}$.

8- The set of non - positive integers = { 0 , -1 , -2 , -3 , ...} = $\{0\} \cup Z^{-}$.

9- The set of odd integers = { ...., -3 , -1 , 1 , 3 , ...} .

10- The set of even integers = { ......, -4 , -2 , 0 , 2 , 4 , ...} .



1) **Put the suitable sign ($\in$, $\notin$, $\subset$, $\not\subset$):-**

a) -3	…………	N	b) 0	…………….	Z
c) 0	………..	Z^+	d) {0}	………………	Z^-
e) $\frac{1}{7}$	…………….	Z	f) N	…………..	Z^+
g) { 2 , 5 , 2/7 }	……	Z	h) Z^-	………………	N
i) {15}	………	Z^-	j) $9/(7+7)$	………	Z

2) **Write on integer to represent each situation** : -

a) Karim's salary is L.E. 350 .

b)A temperature is 12°C below zero .

c)A bank deposit of L.E. 750 .

d)A gain of 7 yd .

e)A loss of L.E. 20 .

f)A profit of L.E. 100 .

g)Up 3 flights of stairs .

h)Down 4 flights of stairs .

3) **Complete** :-

a) Z = …………… ∪ …………… ∪ ……………

b) Z = N ∪ ……………

c) $Z^+ \cap Z^-$ = ……………

d) Z - N = ……………

e) $Z^+ \cup \{ 0 \}$ = ……………

f) Z – N = ……………

g) $N - Z^{+} =$ ……………

h) $Z - Z^{-} =$ ……………

i) Z^{+} …………… Z

J) $N \cup Z =$ ……………

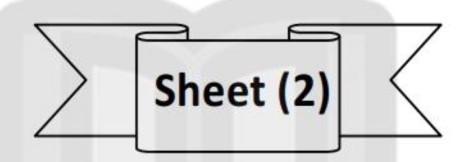
k)The set of odd numbers U the set of even numbers = …………





Opposite (inverse) and absolute value

- The opposite of the number a is (- a) .
- The absolute value of any number X is denoted by | X | , and the absolute value of any number except 0 is always positive .



1) **Represent the following numbers on the number line** :

a) 3 , - 4 , 1 , -2

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

b) - 3 , 0 , 2 , 1 , - 6 , 5

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

c) -4 , -5 , -6 , ……………

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

2) **Write the opposite (inverse) of each integer** :

a) -3 =………. b) 14 =…………….

c) 0 =……….. d) |-34| = ………..

e) -|6| =……….

3) **Find the value of X** :

a) $|X| = 5$

x = ...

b) $X = |-3|$

x = ...

c) $-|2| = X$

x = ...

d) $X = |4|$

x = ...

e) $-4 \in \{7, X, -3\}$

x = ...

f) $X \subset \{-3, 2, 4\} \cap \{-3, 2, 4\}$

x = ...

g) $\{2, 4, X\} \cup \{2, 5, 3\} = \{2, 3, 4, 5, 6\}$

x = ...

h) $|-10| \subset \{7, -5, X\}$

x = ...

i) $X \in \{2, 5, -3\} \cap \{5, -2, -3\}$

x = ...

j) $|-5| \subset \{X, -6, 2\}$

x = ...

k) $X + 2 = |-4|$

x = ...

4) **<u>Find each of the following</u>** :

a) |-3| + |2|

....

b) |5| - |4|

....

c) |-5| - 5

....

d) |0| + |5|

....

e) |-3| × |-5|

....

f) 1 - |0| × |2|

....

g) 8 × |-11|

....

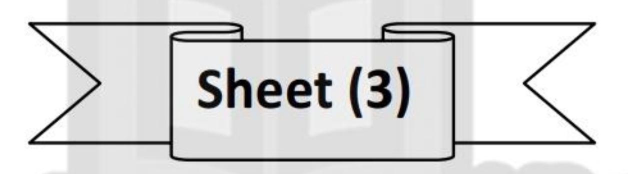
h) - |30| ÷ |-5|

....



Ordering and comparing integers

- Any positive integer is greater than any negative integer .
- The zero number is smaller than any positive integer.
- The zero number is greater than any negative integer.
- The least positive integer is 1 .
- The greatest negative integer is -1 .



1)**Put (> , < or =)** :

a) 3 .... -3

b) -3 .... -4

c) 0 1

d) -8 4

e)|15|-|10| .... |-3| + |-6|

f) 8 .... |-8|

g) 0 .... |-10|

h) -6 .... -|-3|

i) -12 .... -3

2)**Complete** :

a) The number ....is neither positive nor negative .

b) The largest negative integer is ....

c) The smallest positive integer is ....

d) The smallest non-negative integer is ....

e) The largest non-positive integer is ……………

f) -5 , -4 , -3 , …… …… . , ………… , …………

g) 3 , 2 , 1 , ………… , …… …… . , …………

h) -2 , -4 , -6 , …… …….. , ………… , ……….

i) 9 , 7 , 5 , …… …. . , ………… , …………

3) **Arrange in an ascending order each of the following** :

a)-22 , 11 , -11 , 0 , 7 .

……………………………………………………………………

b)-3 , 5 , 2 , -7 , 10 , -6 .

……………………………………………………………………

4) **Arrange in descending order each of the following** :

a) -28 , -35 , 33 , -37 , 2 .

……………………………………………………………………

b) 28 , -52 , 4 , -15 , -3 , -21 , -16 , |7| .

……………………………………………………………………

Adding and subtracting integers

** First : addition in Z :

- **Possibility of addition in Z** :

a) Adding two positive integers :

- The sum of two positive is a positive integer .

b) Adding two negative integers :

- The sum of two negative integers is a negative integer .

c) Adding a positive integer and a negative integer :

- The sum of a positive integer and a negative integer will have the sign of the integer with the greatest absolute value .

- Properties of addition in Z :

1- Closure property :

- The sum of two integers is an integer (The operation is always possible in Z OR Z is closed under addition) .

i.e : If a , b are two integer , the $a + b \in Z$.

2- Commutative property :

- If a , b are two integers , then $a + b = b + a$.

(Z is commutative under addition)

3- Associative property :

- If a , b and C are three integers , then $a + b + C = (a + b) + C$

$= a + (b + C)$

4- The existence of the additive identity (neutral) element in Z :

- For any integer a , we have a + 0 = 0 + a = a .

(Zero is the additive identity element in Z) .

5- The existence of additive inverse (opposite) property :

- For every integer (a) there is an additive inverse (-a)

where a+ (-a) = 0

- The additive inverse of zero is zero .

- The additive inverse of -a is a .

** Second : Subtraction in Z :

- **Possibility of subtraction in Z** :

- Since each integer has an additive inverse , then the subtraction operation is always possible in Z .

- **Properties of subtraction** :

1- Closure property :

- Z is closed under subtraction operation

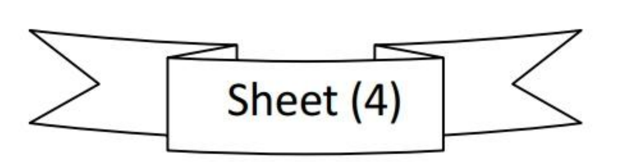
(The result of subtracting any two integers is an integer) .

2- Commutative property :

- The subtraction operation in Z is not commutative .

3- Associative property :

- The subtraction operation in Z is not associative .



1)**Complete** :

a) 4 + (-3) = (-3) + ...

b) 3 + ... = 0

c) -2 + ... = 0

d) 7 + ... = 3

e) 5 + ... = -2

f) -3 + ... = 3

g) -7 - (-4) = -7 + ...

h) The additive inverse of 0 is ....

i) -3 + (......... + 6) = -3

j) (3 + (-2)) + 8 = 3 + (........ + 8)

k) If a + b = b + c , then c = ...

l) The result of subtracting 8 from -3 is ....

m) If a + b = b , then a = ...

n) If a + b = 0 , then a is ....

2)**Write sometimes , always or never** :

a) The sum of positive integer is ....zero .

b) The sum of negative integer is ....negative .

c) The sum of positive integers is ....positive .

d) The sum of positive integers is ....negative .

e) The sum of a positive integer and a negative integer is .... a positive integer .

2- **Use the properties of adition in Z to find** :

a) 5 + (6) + (-5)

………………………………………………………………………

………………………………………………………………………

………………………………………………………………………

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………………………………………………………………………

b) (25) + (-8) + (-25) + 7

………………………………………………………………………

………………………………………………………………………

………………………………………………………………………

………………………………………………………………………

………………………………………………………………………

c) (-3) + (-5) + 4 + (-2) + 8

………………………………………………………………………

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3- **Find the value of (n) in each of the following** :

a) -8 + 0 = n n = ………………

b) -6 + n = -6 n = ………………

c) n + 6 = 0 n = ………………

d) 27 + (-27) = n n = ………………

4- **Evaluate each expression for a = -4** :

a) 36 - a

……………………………………………………………………

……………………………………………………………………

b) a - (-33) - 30

……………………………………………………………………

……………………………………………………………………

c) 7 - |a| - (-11)

……………………………………………………………………

……………………………………………………………………

5- **If a = 3 , b = -4 and C = -2 , then find the value of** :

a) a + b

……………………………………………………………………

……………………………………………………………………

b) ac

……………………………………………………………………

……………………………………………………………………

c) a - b

……………………………………………………………………

……………………………………………………………………

d) abc

……………………………………………………………………

……………………………………………………………………

e) b - b

……………………………………………………………………

……………………………………………………………………

f) a + b + c

……………………………………………………………………

……………………………………………………………………

g) a - b + c

……………………………………………………………………

……………………………………………………………………

6- The temperature on Sunday morning was -2°C. The temperature dropped 7°C. by Monday and then rose 5°C. by Tuesday . What was the temperature on Tuesday ?

……………………………………………………………………

……………………………………………………………………

7- **Write , using the listing method each of the following sets** :

a) The set of integers greater than -2 .

……………………………………………………………………

b) The set of integers between -2 and 2 .

……………………………………………………………………

c) The set of non-negative integers .

……………………………………………………………………

Multiplying and dividing integers

** First : Multiplying in Z :

- Possibility of multiplication in Z :

a) Multiplying operation is always possible in Z :

1- The product of two positive integers is positive .

2- The product of a negative integer and a positive integer is negative .

3- The product of a positive integer and a negative integer is negative .

4- The product of two negative integers is positive .

5- Multiplying any integer by zero equals zero .

b) Properties of multiplication in Z :

1- Closure property :

- The set Z closed under multiplication (The product any two integers is an integer) .

2- Commutative property :

If a and b are two integers , then a × b = b × a . (The set Z is commutative under multiplication)

3- Associative property :

If a , b and c are three integers then : a × b × c=(a × b) × c = a × (b × c)

4- The existence of the multiplicative identity (neutral) element in Z :

- for any integer , we have 1 × a = a × 1 = a

(The number (1) is the multiplicative identity (neutral) .

5- Multiplication is distributed over addition and subtraction in Z :

- If a , b and c are three integers , then :
- $a \times (b + c) = a \times b + a \times c$ and $(b + c) \times a = b \times a + c \times a$
- $a \times (b - c) = a \times b - a \times c$ and $(b - c) \times a = b \times a - c \times a$

** Second : Division in Z :

- **Possibility of division in Z** :

- Division is not always possible in Z OR Z is not closed under division .

Notes :

The quotient of zero divided by any non zero integer is zero .

- **Properties of Division** :

1- Closure property :

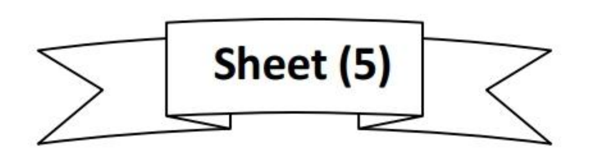
- Division is not always possible in Z OR Z is not closed under division .

2- Commutative property :

- Division operation in Z is not commutative .

3- Associative property :

- Division operation in Z is not associative .



1) **Complete** :

a) 5 × …………… = 0

b) The additive neutral element in Z is ……………, while the multiplicative neutral element in Z is ……………

c) -1 × …………… = 1

d) If a × b = 0 , and a ≠ 0 , then b = ……………

e) The quotient of two integers having different signs when the division operation is possible in Z is a ……………integer .

f) If a ÷ b = 1 , then b = ……………

g) If a ÷ b = -1 , then b is the ……………of a .

h) The quotient of (-36) ÷ (-4) = ……………

i) If X = -2 , Y = 3 , then the value of 4 XY= ……………

j) ………… × 9 = -3 × 21 .

k) If $x/5$ = 4 , then X = ……………

2) **Use the properties of multiplication of integers to find** :

a) 5 × 17 × 2

……………………………………………………………………

……………………………………………………………………

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c) (-25) × 32 × (-4)

………………………………………………………………………

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d) 8 × 77 × (- 125)

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a) **Use the distributive property to find each of the following** :

a) 3 × (-2) + 3 × 5

………………………………………………………………………

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………………………………………………………………………

b) 23 × (-121) + 23 × 21

………………………………………………………………………

………………………………………………………………………

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………………………………………………………………………

c) 45 × (-16) + (-47) × (-16) + (-16)

…………………………………………………………………

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…………………………………………………………………

…………………………………………………………………

d) 26 × 101

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

e) 32 × 98

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

f) 6 × [-2 + (-7)]

…………………………………………………………………

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4) If a = 2 , b = -3 and c = 5 , then find the value of each of the following :

a) 2a + 4b

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

Repeated multiplication

If a is an integer and $n \in Z^+$, then a × a × a × ....to n times = a^n .

Where a is called the base and n is called the power or index or exponent .

Notes :

1- Any number to the first power is that number itself .

2- Any number to the zero power , except zero , is 1 .

3- If the base is one and $n \in Z$, then $1^n = 1$.

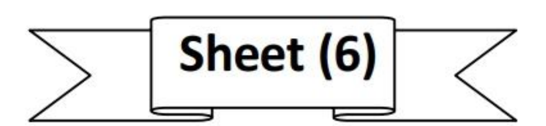
4- If $a \in Z$ and $n \in Z^+$, then $(-a)^n = a^n$ if n is even .

$= -(a)^n$ if n is odd .

** The rule of adding powers in multiplying numbers of the same base : If $a \in Z - \{0\}$, n , $m \in Z^+$, then $a^m \times a^n = a^{m+n}$.

** The rule of subtraction power in dividing numbers of the same base :

If a is an integer and $a \neq 0$, n , $m \in Z^+$, $m > n$, the $\frac{a^m}{a^n} = a^{m-n}$



1- **Complete** :

a) $7 \times 7 \times 7 = 7^{....}$

b) $8 \times 8 \times 8 \times 8 \times 8 \times 8 = 8^{....}$

c) Ten to the twelfth power = ...

d) Four cubed = $......^{....}$

e) Five squared = $......^{....}$

f) $(-5)^2$ ....N.

g) $(-11)^0$ ....N.

h) The additive inverse of $(-8)^0$ is ....

i) $(X^8)^2$ = ...

j) $2^2 + 2$ = ...

k) $2^5 - 2^4 = 2^{....}$

l) $2^8 \div 2^4 = 2^{....}$

m) If X = -5 , then X^2 = ...

n) If $3^5 \div 3^a = 3^0$, then a = ...

2- **Put (> , < or =)** :

a) 2^5 .... 5^2

b) $(-4)^5$ .... $(-4)^2$

c) $|-8|$ .... 2^3

d) $(2^3)^2$ .... $(2^2)^3$

e) $2^2 + 2^3$ .... $2^2 \times 2^3$

3- Find the value of each of the following :

a) $2^2 \times 2^3$

....

....

b) $(-5)^3 \times 5^2$

....

....

c) $X \times X^3 \times X^5 \times X^7$

....

....

d) $2^7 \div 2^5$

....

....

e) $a^6 \div a^3$, $a \neq 0$

....

....

f) $2^3 \times 3^2$

....

....

g) $5^3 \times 2^2 \times 5^2 \times 2^3$

....

....

a) $\frac{5^3 \times 5^2}{5^4}$

....

....

b) $\frac{9^5 \times 9^4}{9^3 \times 9^6}$

…………………………………………………………………

…………………………………………………………………

4- Simplify : $\frac{x^5 \times x^4}{x^2 \times x^6}$

Then find the value of the result when X = -1 .

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5- Use the distributive property to calculate the value of $(17)^2 + 17 \times 83$

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6- Let X = -2 , Y = -3 and Z = 2 , so find :

$X^2 + Y^2 - Z^0$

…………………………………………………………………

…………………………………………………………………

…………………………………………………………………

7- Find the value of X in each case of the following :

a) $5 \times X = 45$

…………………………………………………………………

b) $-3 \times X = 27$

…………………………………………………………………

Numerical patterns

** **Numerical pattern** :

Is a sequence of numbers according to a particular rule .

** **Describing of the pattern** :

Means discovering the rule of the pattern and expressing it in words .



1- **Complete in the same pattern** :

a) 1 , 2 , 3 , 4 , ... , ...

b) -8 , -6 , -4 , ... , ...

c) 1 , 4 , 7 , 10 , ... , ...

d) -3 , 9 , -27 , ... , ...

e) 7 , -1 , -9 , -17 , ... , ...

f) 8 , 4 , 2 , ... , ... , $\frac{1}{4}$

g) 2 , 7 , 12 , 17 , ... , ...

h) 192 , 96 , 48 , 24 , ... , ...

2- Karim saves L.E. 52 every month . How many months does he need to save about L.E. 160 ?

Write the numerical pattern which expresses this and describe it .

....

....

3- Find the value of : $\frac{3^4 \times (-3)^5}{3^7}$

....

....

1- Complete :

a) 3 , 9 , 27 , ... (in the same pattern)

b) $Z^+ \cap Z^-$ = ...

c) |-2|-2 = ...

d) $Z^+ \cup Z^- \cup \{ 0 \}$ = ...

e) $2^3 \times 2^3 = 2^{....}$ = ...

f) -3 × 5 = 5 × (-3) (..............property)

g) $\frac{2^5 \times 2^6}{2^7 \times 2}$ = ...

h) $Z^+ \cup \{ 0 \}$ = ...

i) - |-54| = ...

j) 19 - (-11) = ...

k) 4 + (-3) = (-3) + ... (..............property)

l) The additive neutral element in Z is ....

m) 2 , 3 , 5 , 8 , 13 , ... , ... , ...(in the same pattern)

n) (a + b) + c = ... + (b + c)

o) 8 × .... = -48

p) 8 + ... = 0 (..............property)

q) a + 0 = 0 + a (..............property)

s) If a × b = a , and a ≠ 0 , then b = ...

t) If c = 6 , then -24 + 2c - 7 = ...

b) 2a + c + 3b

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

5) Find the result of each of the following :

a) 9 - 5

……………………………………………………………………

b) 6 - 11

……………………………………………………………………

c) -7 - 4

……………………………………………………………………



u) The result of subtracting 7 from (-2) is ....

v) The additive inverse of zero is ....

w) Addition of two negative integers is ....

x) 5 + ... = 0

y) The multiplication of two negative integers is a ....integer .

z) The smallest positive integer is ....

a) The largest negative integer is ....

b) $(-7)^0 + 5 =$ ....

c) If X = -1 , then $X^{99} + X^{100} =$ ....

d) The additive inverse of the number 8 is ....

e) If 8X = -48 , then X = ...

f) The set of integers between -3 , 2 = ...

g) The multiplicative identity element is ....

h) The following numerical pattern is (2 , 6 , 10 , 14 , ...) and its rule is ....

i) Z ∩ { 0 } = ...

j) 113 × 15 + 113 × (-15) = ...

k) A × (B + C) = ... + A × C

l) The descending arrangement of the number: 3 , -30 , -|8| , 0 is ....

m) If : a ∈ { 2 , -5 , -3 } ∩ { 5 , -2 , -3 } , then a = ...

n) The product of multiplication of two negative integers is a .... integer .

o) a + (-a) = 0 (................property)

p) a × 1 = a (................property)

q) 7 (6 + (-3)) = 7 × .... + ... = ...

r) 1/3 , 2/3 , 1 , 4/3 , ... , ...

2- Choose the correct answer :

1-The additive inverse of $(-1)^3$ is ....

a) 1 b) -1 c) 3 d) -3

2- { 0 , 10 } ....Z^+

a) ∈ b) ⊂ c) ∉ d) ⊄

3- 3 + | -3 | 6

a) = b) > c) < d) ≠

4- $(-1)^3 + (-1)^4$ = ...

a) 0 b) -1 c) 2 d) -2

5- 3/5 .... Z

a) ∈ b) ⊂ c) ∉ d) ⊄

6- $Z - Z^-$ = ...

a) Z^+ b) N c) { 0 } d) Z - { 0 }

7- $(-2)^6 \div 2^3$ = ...

a) 2^2 b) 6^3 c) $(-2)^3$ d) 2^3

8- $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{64}$, ... (in the same pattern) .

1

a) 1/32 b) 1/64 c) 1/128 d) 1/256

9- 0 ÷ (-3) = ...

a) 1/3 b) -3 c) 1 d) zero

10- $(-2)^0$ .... (-1)

a) = b) < c) > d) ≤

11- N ∩ Z = ...

a) Z b) N - { 0 } c) Z^+ d) Z^-

12- If X + 2 = |-4| then X = ...

a) -2 b) 2 c) -6 d) 6

13- If $|X| = 5$, then X = ...

a) 5 b) -5 c) ± 5 d) 0

14- $\left|\frac{5-11}{3}\right|$ .... Z^+

a) $\in$ b) $\notin$ c) $\subset$ d) $\not\subset$

15- The number of integer numbers between -2 and 3 = ...

a) 3 b) 4 c) 5 d) 6

16- $Z^+ - Z^-$ = ...

a) { 0 } b ϕ c) N d) Z^+

17- Zero ....Z^+

a) $\in$ b) $\notin$ c) $\subset$ d) $\not\subset$

18- $(-3)^5$ ....N.

a) $\in$ b) $\notin$ c) $\subset$ d) $\not\subset$

19- $(X^2)^8$ = ...

a) X^{16} b) X^4 c) X^{10} d) X^{28}

20- An integer included between -1 , 2 is ....

a) -1 b) 2 c) 1 d) -2

21- 1/5 ....Z

a) $\in$ b) $\notin$ c) $\subset$ d) $\not\subset$

22- -2 + 6 = ...

a) 4 b) -4 c) 8 d) -8

23- $|-9| + 3$ ....Z

a) $\in$ b) $\notin$ c) $\subset$ d) $\not\subset$

24- Set of the integer numbers Z = N $\cup$ ....

a) Z^- b) Z^+ c) ϕ d) { 0 }

25- The integer number just before the number -5 is ....

a) -6 b) -4 c) 4 d) 6

26- $4 + (-6) >$ ....

a) 2 b) zero c) -2 d) -4

27- $|-5| +$ .... $= 0$

a) -5 b) 5 c) 0 d) 1

28- -7 2

a) > b) < c) = d) ≥

29- $(-6)^2$ .... -12

a) > b) < c) = d) ≤

30- { 0 , 10 } ....Z+

a) ∈ b) ∉ c) ⊂ d) ⊄

31- $(-1)^4$ .... $(-1)^5$

a) > b) < c) = d) ≥

32- $(-5)^2 <$ ....

a) $(-2)^5$ b) -5×2 c) -5×-2 d) 2^5

33- $|-9| + 3 \div 2$ .... Z

a) ∈ b) ∉ c) ⊂ d) ⊄

c) ⊂ d) ⊄

3- Simplify : $\frac{(-3)^5 \times 3^4}{(-3)^7}$

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4- Using the distributive property to find :

$23 \times (-121) + 23 \times 21$

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5- If X = 8 , Y = -2 , then find the value of X - 2Y + 4

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6- Simplify : $\frac{5^2 \times (-5)^2 \times (-5)^3}{5^4 \times (-5)}$

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7- Use the addition properties in Z to find :

25 + (-8) + (-25) + 7

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8- If a = 2 , b = -3 , then find the value of $a^2 + b^2 + a\,b$

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9- Simplify : $\frac{2^2 + 2^3}{2^4}$

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10- Arrange the following numbers in an ascending order :

-9 , 17 , |-9| , -15 , 16 , 0 , -30

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11- Find the result of the following by two ways :

a) -6 × [-3 + 2]

b) [7 + (-4)] × 9

12- Use the properties of multiplication to find :

4 × 8 × 25 × (-125)





Model of Test on Unit 1

1- **Complete** :

a) 3 , 9 , 27 , ... (in the same pattern)

b) $-3 \times 5 = 5 \times (-3)$ (...............property)

c) $Z^{+} \cup \{0\}$ = ...

d) The additive neutral element in Z is ....

e) If c = 6 , then -24 + 2c - 7 = ...

2- **Choose the correct answer** :

1- The additive inverse of $(-1)^3$ is ....

a) 1 b) -1 c) 3 d) -3

2- $(-2)^6 \div 2^3$ = ...

a) 2^2 b) 6^3 c) $(-2)^3$ d) 2^3

3- $0 \div (-3)$ = ...

a) 3 b) -3 c) 1 d) zero

4- $N \cap Z$ = ...

a) Z b) N - { 0 } c) Z^{+} d) Z^{-}

5- If |X| = 5 , then X = ...

a) 5 b) -5 c) ± 5 d) 0

3- If X = 3 , Y = – 4 , then find the value of X - 2Y + 4

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4- Use the addition properties in Z to find

(-125) + 25 + (-8) + 125 + (-25) + 7

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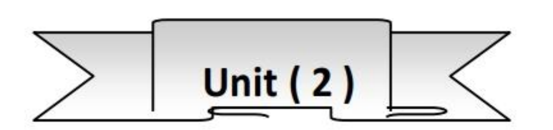
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5- Simplify :

$$\frac{5^4 \times (-5)^3 \times (-5)^3}{(-5)^4 \times 5}$$

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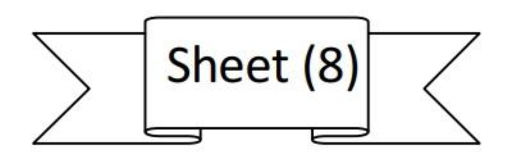


The equation and inequality of first degree

- The equation :
  Is a mathematical sentence includes equality relation between two sides .
- The concept of the equation :
  It is a mathematical sentence which contains one unknown and the equality relation (=) .
- The inequality :
  Is a mathematical sentence including the sign of inequality between two sides .
- The concept of the inequality :
  It is a mathematical sentence which contains one unknown or more and contains inequality relation (< or >) .

Some important concepts

- The degree of the equation (or inequality) :
  It is determined by the highest power of the unknown in the equation or inequality .
- The substituting set :
  It is the set contains the probable values of the unknown .
- Solving the equation (or inequality) :
  It is finding the value or values of the unknown that satisfy the equation or inequality from the substituting set .
- The solution set (the S.S.) :
  It is the set whose elements satisfy the equation or the inequality and it is a subset of the substitution set .



6- Find the solution set of each of the following equations and inequalities :

a) $X + 7 = 10$, if the substitution set is { 1 , 3 , 5 } .

b) $3X - 4 = 8$, if the substitution set is { 3 , 5 , 6 } .

c) $3X + 5 = -4$, if the substitution set is { 0 , -1 , -2 , -3 } .

d) $3(X - 2) = -6$, if the substitution set is { 7 , 8 , 9 } .

e) $2X + 1 = X - 3$, if the substitution set is { 2 , 4 , – 1 , – 4 } .

f) $X - 4 > 1$, if the substitution set is { 7 , 6 , 5 , 4 } .

g) $3X + 4 \leq -2$, if the substitution set is { − 1 , 0 , 1 , 2 , 3 }.

h) $5X - 1 > 4$, if the substitution set is { 2 , 3 , 4 , 5 , 6 } .

7- **Choose the correct answer** :-

1- Which of the following represent an equation ?

a) $2X > 9$ b) $5X \geq 30$

c) $X - 4$ d) $2X + 1 = 5$

2- The equation $X^2 - 4 = 8$ is of ....degree .

a) first b) second c) third d) fourth

3- The number -5 is a solution to the equation ....where the substitution set is Z .

a) $X - 3 = 2$ b) $2X - 1 = 9$

c) $-2X + 3 = 13$ d) $X + 3 = 2X + 12$

4- If 3 is a solution to the equation $2X - 4 = a$, then a = ...

a) 3 b) 2 c) -2 d) -3

Solving first degree equation in one unknown

- **The properties of the equality relation** :

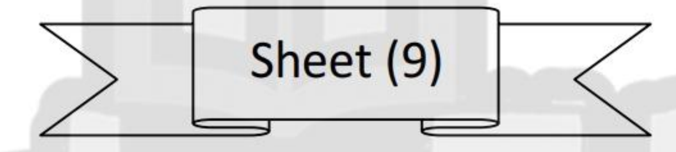
If a , b and c are three integers , then these numbers have the following properties :

1- If a = b , then a + c = b + c .

2- If a = b , then a - c = b - c .

3- If a = b , then a × c = b × c .

4- If a = b , then a ÷ c = b ÷ c where c ≠ 0 .



1- **Find the solution set of each of the following equation** :

a) X + 4 = 7 where X ∈ N

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b) X - 3 = -7 where X ∈ Z

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c) X + 8 = 0 where X ∈ Z

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d) 2X - 1 = 5 where X ∈ N

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e) $8X + 12 = 4$ where $X \in Z$

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f) $3X - 13 = 26$ where $X \in Z$

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g) $2Y + 16 = 2^4$ where $Y \in N$

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h) $8 - 2X = -2$ where $X \in Z$

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i) $\frac{y}{2} + 2 = -4$ where $Y \in Z$

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j) $2X + 3X = 25$ where $X \in Z$

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k) $3X - 5X = 8$ where $X \in N$

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l) $3X + 4 = X + 12$ where $X \in N$

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m) $6Y - 2Y + |-7| = |-4|$ where $Y \in Z$

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n) $2X + 3X + 25 = 5$ where $X \in Z$

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o) $\frac{3x-4}{5} = 7$ where $X \in N$

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p) $2(X-3) = 4$ where $X \in N$

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q) $4(X+1) = 2(X-1)$ where $X \in N$

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r) $3(X-2) = 5X - 10$ where $X \in Z$

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2- **Complete** :

a) If $2X - 1 = 5$, then $X =$ ....

b) If $4X = 24$, then $\frac{x}{3} =$ ....

c) If $3Y = 6$, then $5Y =$ ....

d) The S.S. of the equation $X - 5 = 2^4$ in Z^- is ....

e) If $2X = 2$, then $3X - 1 =$ ....

f) If $2ab = 10$, then $3ab =$ ....

g) If $5X + 8X + 2X + 4X = 114$, then $5X + 3 =$ ....

3- Given that the substitution set is $L = \{ 0 , 1 , 2 , 3 \}$, find the solution set of :

a) The equation $X + 3 = 5$.

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b) The inequality X + 3 < 5 .

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Applications on solving first degree equations in Z

Notes :

1- If a number = X , then its twice = 2X and its three times = 3X , ...

2- If a number = X and another number exceeds it by 5 , then the other number = X + 5 .

3- If a number = X and another number decreases that it by 5 then the other number = X - 5 .

4- If the difference between two integers is 4 and the smaller number = X , then the greater number = X + 4 .

5- If the age of a man now = X years , then :

a) His age after 3 years (X + 3) years .

b) His age 3 years ago = (X - 3) years .

6- Two consecutive integers are X , X + 1 .

7- Three consecutive integers are X , X + 1 , X + 2 .

8- Two consecutive odd (even) natural numbers are X , X + 2 .

9- Three consecutive odd (even) natural numbers are X , X + 2 , X + 4

Activity

Share your class female to solve this problem .

Find the number if we subtract it from its half the result will be 8 .



Sheet (10)

1- An integer which add to it 7 , the result will be 12 , find the number .

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2- What is the number , which we add 9 to its twice , the result equals 17

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3- Find the number which if we subtract 9 from its triple the result will be 6 .

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5- Two natural numbers , one of them is twice the other and their sum is 108 , find the two numbers .

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5- Two consecutive integers whose sum is - 55 , find them .

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6- The sum of three consecutive even numbers is 120 . find the three numbers .

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7- If a man's age is three times his son's age and the sum of their ages is 72 years , what is the age of each of them ?

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8- The length of a rectangle is three times its width and its perimeter 24cm. , find its area .

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9- Choose the correct answer :

The solution set of the equation X + 3 = 12 is equal to the solution set of the equation :

a) X - 3 = -12

b) X + (-3) = 12

c) X - (-3) = 12

Solving first degree inequality in one unknown

- **Properties of inequalities** :

Assuming that a , b and c are three integers , then :

1- If $a < b$, then $a + c < b + c$.

2- If $a < b$, then $a - c < b - c$.

3- If $a < b$, c a positive number , then $a c < b c$.

4- If $a < b$, c is a negative number , then $a c > b c$.

5- If $a < b$, c is a positive number then $\frac{a}{c} < \frac{b}{c}$

6- If $a < b$, c is a negative number then $\frac{a}{c} > \frac{b}{c}$

Sheet(11)

1- Find the S.S. of each of then following inequalities , then represent on the number line :

a) $X + 5 < 9$ where $X \in N$

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b) $3X < 12$ where $X \in N$

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c) $X - 4 \leq -1$ where $X \in Z$

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d) $2X + 1 < 7$ where $X \in N$

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e) $3X - 2 > 1$ where $X \in N$

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f) $1 + 2X \leq -3$ where $X \in Z$

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g) $3X + 9 > 0$ where $X \in Z$

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h) $1 - 3X > 7$ where $X \in N$

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i) $3 < X + 2 \leq 6$ where $X \in N$

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j) $5 < 3 - X \leq 3^2$ where $X \in Z$

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k) $2X + 5X \geq 14$ where $X \in Z$

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l) $6X + 2 \geq 14 + 5X$ where $X \in Z$

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2- **Complete** :-

a) If $X > Y$, then $X + Z$ $Y + Z$

b) If $X < Y$, then $X - Z$ .... $Y - Z$

c) If $a - 3 < 0$, then .... > ....

d) If $b < 0$, then $b + 3$ 3

e) The S.S. of the inequality : $-5 < -X \leq 2$ in Z^+ is ....

f) If $X > Y$ and Z is negative then X Z .... YZ

g) If $X > Y$ and Z is positive , then XZ .... YZ

h) If $X \in Z$, then S.S. of the inequality $20 < 5X < 25$ is ....

3- **Complete each of the following** :-

a) If the age of a man now is X years , then his age 5 years ago was …………

b) If the age of a man now is Y year , then his age after 6 years will be …………

c) If the middle number of three consecutive natural numbers is X, then the sum of these numbers in the simplest form = …………

d) Two integers whose sum is 5 , if one of them is X , then the other one is …………

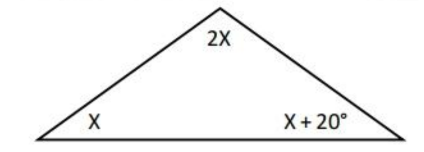
e) Two consecutive natural numbers , the smaller one is X , then the greater one is …………

f) Two consecutive integers , the greater one is X - 1 , then the smaller one is …………

g) Two consecutive even numbers , the smaller one is X + 1 , then the greater one …………

h) Two integers , one of them exceeds the other by 4 and the smaller one is X - 1 , then the greater one is …………

4- Find the measure of each angle in the opposite triangle .



1- **Complete** :

a) The S.S. of the equation $3X + 1 = -5$ in Z is ………….

b) If $2X + 3 = 13$, then $3X - 2 =$ ………….

c) The S.S. of the equation $2X - 5 = -9$ in Z^+ is ………….

d) If the substitution set is { 1 , 2 , 3 } , then the S.S. of the equation $3X + 5 = 5X - 3$ is ………….

e) If $X + 9 = 11$, then the value of (7X) equals ………….

f) The S.S. of the equation $2X = -6$ in Z is ………….

g) If the age of a man now is X years , then his age 6 years ago is …………..

h) $4X - 8 = 0$ is an equation of the ………….degree .

i)Two consecutive natural odd numbers , the smaller one is 23 then the greater one is ………….

j) The equation : $X^2 + 3 = 4$ its degree is ………….

k) The equation is a mathematical sentence includes ………….relation between two sides .

l) If $X \in Z$, then the S.S. of in equality $3 < X < 4$ is ………….

m)The solution set of the equation $2X-1 = -1$ is …………. if the substitution set is { 0 , 1 , 2 , 3 } .

2- **Choose the correct answer** :

1. If $2X + 5 > 3$, $X \in Z$ then the solution set = ...

a) N b) N - { 0 } c) Z^- d) Z^+

2. Two consecutive natural odd numbers , the small one is X , then the great one is ....

a) X + 1 b) X + 2 c) X + 3 d) 2X

3. The S.S. of the equation : $-2X < 0$ in Z is ....

a) N b) Z^+ c) Z^- d) Z

4. The S.S. of the equation $1 - 3X = 7$ in Z is ....

a) { -1 } b) { -2 } c) Ø d) { 2 }

5. Which of the following represent an equation ?

a) X - 17 b) 22 - 7 = 15 c) X > -11 d) 2X + 3 = 7

6. The number that satisfy the inequality $X - 2 > 3$ is ....

a) 3 b) 4 c) 5 d) 6

7. The number which satisfies the inequality $X > -2$ is ....

a) -1 b) -4 c) -3 d) -2

8. The equation $X^2 + 3 = 4$ is of ....degree .

a) first b) second c) third d) fourth

9. The number that if we add it to its double the result will be 12 is ....

a) 2 b) 3 c) 4 d) 5

10. If $X + 3 = 8$, $X \in Z^-$, then the solution set = ...

a) {-3} b) {5} c) {-5} d) ϕ

11. If $2X + 5 > 3$, $X \in Z$ then the solution set = ...

a) N b) N - {0} c) Z^- d) Z^+

3- **Find the S.S. of each of the following** :

a) $3X + 7 = X + 17$ where $X \in Z$

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b) $3 - 2X \leq 11$ where $X \in N$

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c) $X + 2 (2X + 1) = 17$ where $X \in Z$

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d) $3 < 2X - 1 \leq 9$ where $X \in Z$

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e) $3X - 7 \le 5X + 3$ where $X \in Z$

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f) $X + 14 > 19$ where $X \in Z$

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g) $3X - 13 = 26$ where $X \in Z$

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h) $3X + 10 = 1$ where $X \in N$

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4- Two natural numbers one of them is twice the other , and their sum is 108 . Find the two numbers .

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5- Three consecutive even number their sum 36 . Find these numbers .

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6- If Hany's age exceeds wael's age by years and next year the sum of their ages will become 32 years . What is the age of each of them now?

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7- Find the number that if we add it to its double the result will be 27 ?

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8- A number consists of two digits , its unit digit is twice its tens digit if the sum if the two digits = 9 find this number ?

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9- Rectangle its length exceeds its width by 3 cm. and its perimeter = 22cm. find its length and its width ?

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Model of Test on Unit 2

1- **Complete** :

a) The S.S. of the equation $3X + 3 = -6$ in Z is ....

b) The S.S. of the equation $2X - 5 = -9$ in Z^+ is ....

c) If the substitution set is { 1 , 2 , 3 } , then the S.S. of the equation $3X + 5 = 5X - 3$ is ....

d) If $X + 3 = 10$, then the value of $(-3X)$ equals ....

e) The S.S. of the equation $2X = -6$ in Z is ....

2- Choose the correct answer :

1- If $2X + 5 > 3$, $X \in Z$ then the solution set = ...

a) N b) N - { 0 } c) Z^- d) Z^+

2- Two consecutive natural odd numbers , the small one is X , then the great one is ....

a) X + 1 b) X + 2 c) X + 3 d) 2X

3- Which of the following represent an equation ?

a) X - 17 b) 22 - 7 = 15 c) X > -11 d) 2X + 3 = 7

4- The number which satisfies the inequality $X > -2$ is ....

a) -1 b) -4 c) -3 d) -2

5- The equation X2 + 3 = 4 is of ....degree .

a) first b) second c) third d) fourth

3- **Find the S.S. of each of the following** :

a) $3X + 7 = X + 17$ where $X \in Z$

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b) $3 < 2X - 1 \leq 9$ where $X \in Z$

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c) $X + 14 > 19$ where $X \in Z$

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4- Three consecutive even number their sum 36 . Find these numbers .

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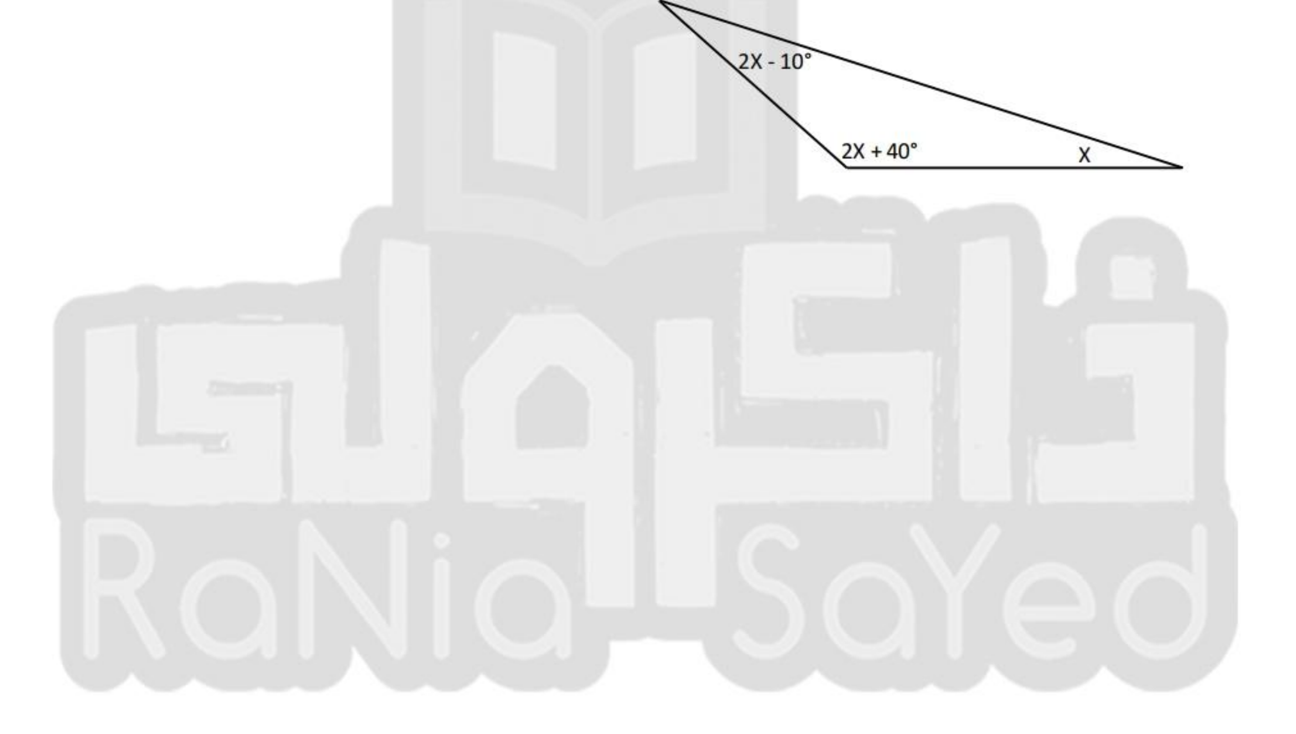
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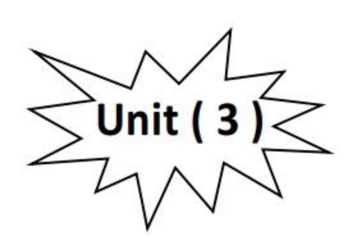
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5- Find the measure of each angle in the opposite triangle.





The distance between two points in the coordinate plane

(a) **The distance between two points on a ray** :

The distance between the two points A and B

a horizontal or vertical ray = AB where :

The length of AB = number of the ending point - number of the starting point = B - A .

(b) The distance between two points , on a straight line :

The distance between the two points A and B on a horizontal OR a vertical line = AB where .

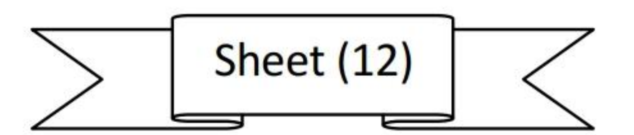
The length of AB = |number of the ending point - number of the starting point | = |B - A | .

(c) **The distance between two points in the coordinate plane** :

To calculate the distance between two points in the coordinate plane do as follows :

1- Determine the line segment joining between them .

2- If it is parallel to OX calculate the distance as horizontal and if it is parallel to OY , calculate the distance as on vertical .



1- In the opposite figure :
If the point A , B , C and D represent the numbers

3 , 0 , -2 , -5 respectively , then complete :

a) CD = ...

b) AD = ...

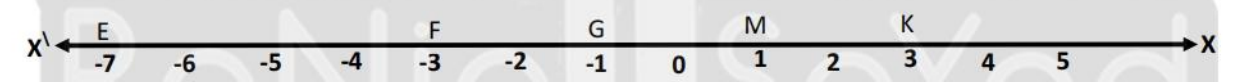
c) BD = ...

d) BC = ...

e) AC = ...

f) AB = ...

2- From the following figure complete :



a) EF = ...

b) FM = ...

c) EG = ...

d) EM = ...

e) FK = ...

f) MK = ...

g) GK = ...

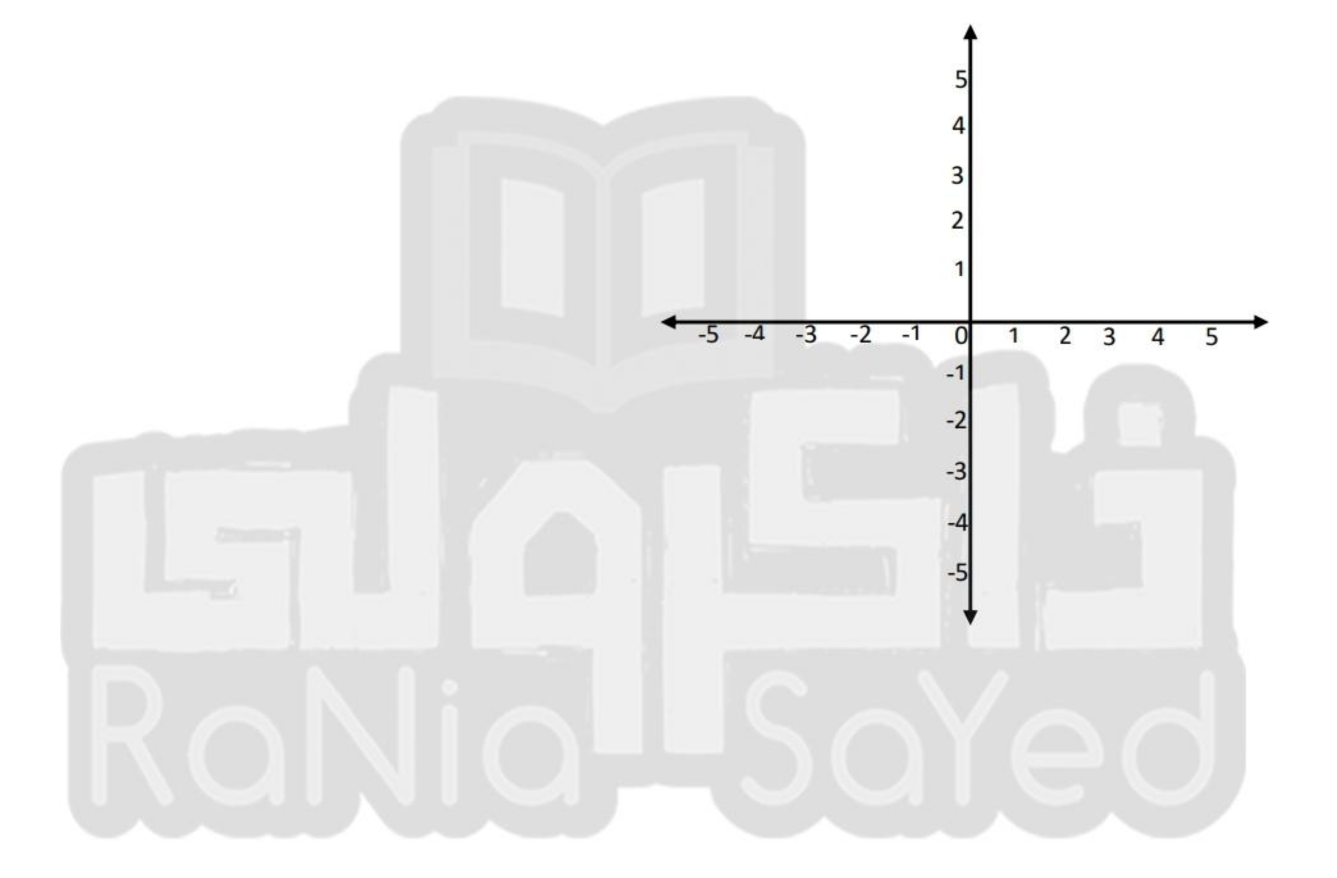
h) EK = ...

3- <u>In the opposite coordinate plane</u> :

a) Determine the position of the following points :

A (-3 , -3) , B (-3 , -2) , C (5 , 2) and D (5 , -3) and mention the name of the shape ABCD .

b) Find the perimeter and the area of the shape ABCD .



4- In the opposite coordinate plane :

Determine the position of the following points :

A (-1 , -4) , B (-1 , 3) and C (5 , -4) , then find :

a) The length of $\overline{AB}$ and $\overline{AC}$.

b) The type of the triangle ABC with respect to its sides and angles .

c) The area of Δ ABC .

5
4
3
2
1
-5 -4 -3 -2 -1 0 1 2 3 4 5
-1
-2
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Geometric transformation
Translation

** First : Translation in the plane :

a) Finding the image of a point by a given translation .

b) Finding the image of a line segment by a given translation .

** Second : Translation in the coordinates plane :

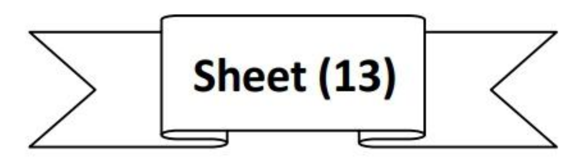
The image of the point A (X , Y) →

The point $A^{\prime}$ (X + a , Y + b) by translation (a , b) .

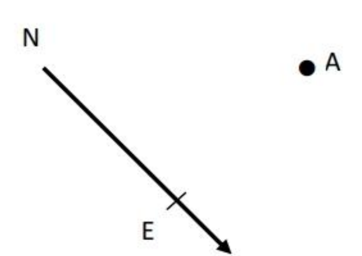
Activity

Design a chart to show the translation .





1- From the opposite figure , find the image of the point A by the translation $\overline{NE}$ in the direction of $\overrightarrow{NE}$.



2- **Complete each of the following** :

a) The image of the point (2 , 5) by translation (X , Y) → (X + 2 , Y + 1) is ....

b) The image of the point (3 , 2) by translation (X , Y) → (X + 3 , Y - 2) is ....

c) The image of the point (0 , 5) by translation (-2 , 1) is ....

d) The image of the point (3 , -2) by translation (X , Y) → (X , Y + 3) is ....

e) The image of the point ....by the translation (X , Y) → (X - 2 , Y + 3) is (7 , 4) .

f) If the image of the point (3 , 2) is the point (6 , 1) , then the translation rule is (X , Y) → (............. , ...)

g) The image of the point A (3 , 6) by translation 5 units in the negative direction of X - axis is ....

h) If (X , Y) is the image of the point (3 , -2) by translation (1 , 3), then the point (X , Y) = ...

i) The image of the point (-1 , 2) by translation of magnitude of 4 units in the positive direction of the Y-axis is ....

j) The image of the point (3 , 0) by translation of magnitude 3 units in the negative direction of X-axis and 4 units in the positive direction of Y-axis is …………..

3- On a square lattice draw AB where A (2 , 3) and (4 , 1) , then draw the image of AB by translation (X , Y) → (X + 3 , Y + 2) .



4- Draw Δ ABC , where A (1 , 1) , B (-3 , -1) , C (0 , -5) then determine graphically its image by translation (5 , 0) .

5- Represent the point A (2 , 3) , B (4 , 3) and C = (4 , 7) in the lattice, then find :

a) BC =……….. length unit ,

AB = ………….. length unit .

b) The image of Δ ABC by translation (0 , -4) .

c) The area of ABC .



Area of the circle

**** <u>The circular sector</u> :**

- It is a part of the surface of the circle bounded by an arce and two radii passing through ends of the arc .
- The area of the circle = πr^2

  where r → the radius of the circle .



1- **<u>Find the area of the following figures</u>** :

a) 3cm (= 3.14)

area = ……………….

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b) 12cm (π = 3.14)

area = ……………….

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b) 28cm ($\pi = \frac{22}{7}$)

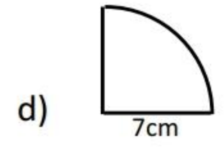
area = ...

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d)



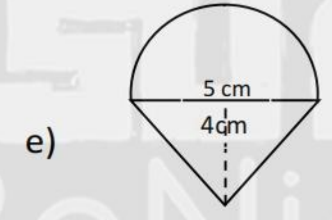
($\pi = \frac{22}{7}$)

area = ...

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e)



($\pi = \frac{22}{7}$)

7

area = ...

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f) 7cm 10cm ($\pi = \frac{22}{7}$)

area = ...

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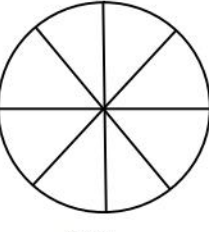
2- Complete :

a) The area of the circle = ...

b) The circumference of a circle = ...

c) The radius of a circle is 14cm. , then its circumference = ...and

its area = ...cm^2. ($\pi = \frac{22}{7}$) .



d) If the area of a circle = 36 π cm^2. then its radius = ...cm.

e) If the area of a circle = 49 π cm^2., then its circumference = ...cm.

f) If the circumference = 30 π mm., then the area of the circle = ...

g) A circle , its diameter length is 8cm. , its area = ...cm^2.

h) If the area of a circle is π cm^2. , then the length of its diameter = ...cm.

i) The circumference of a circle is 44cm. , then the length of its diameter is ....cm. ($\pi = \frac{22}{7}$)

3- Find the area of a circle with a radius of length 21cm. where ($\pi = \frac{22}{7}$).

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4- Find the area of a circle with diameter of length 17.5cm. where

($\pi = \frac{22}{7}$) .

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5- In the opposite figure , a circle M of radius 7cm. , is divided into eight equal circular sectors , calculate the area of one sector where

($\pi = \frac{22}{7}$) .



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6- In the opposite figure a circle M is divided into three equal circular sectors , if the area of one sector is $9.42cm^2$., then find its radius length where , and its circumference . (= 3.14)

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7- Find the area of the shaded part of each of the following figures where (= 3.14) .

a) ABCD is a square of side length 25 cm.
Find the length of shaded part. (= 3.14)

A 25 cm B
D C

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A 8cm B
7cm
D C

b) ($\pi = \frac{22}{7}$)

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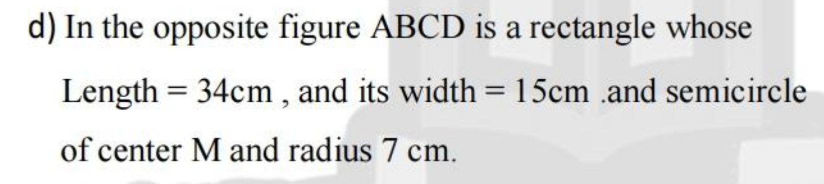
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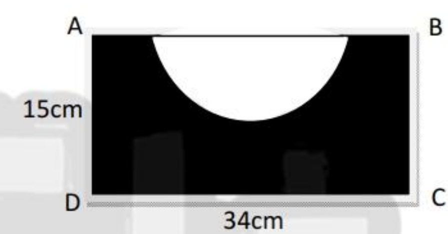
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d) In the opposite figure ABCD is a rectangle whose Length = 34cm , and its width = 15cm .and semicircle of center M and radius 7 cm.

Find the area of the shaded part . ($\pi = \frac{22}{7}$)



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8- In the coordinate plane , draw Δ ABC where A (0 , 1) , B (2 , 3) and c (-1 , 4) by translation (X + 2 , Y + 3) .

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The lateral area and the total area For each of cube and cuboid

** First : The cube :

** The lateral area of a cube = The area of one face X 4 .
= Edge length X itself X 4 .
= Perimeter of the base x height.

** The total area of a cube = The area of one face X 6 .
= Edge length X itself X 6 .

** The area of one face = $\frac{1}{4}$(the lateral area)

= $\frac{1}{6}$ (the total area)

Notes :

1- It has 6 faces , each face is a square and all faces are equal in area .

2- 2- It has 8 vertices and 12 edges .

3- It has 3 dimensions " length , width and height " and they are equal in length .

4- Its volume = the edge length X itself X itself .

5- The area of one face of the cube = the area of the square = the edge length X itself .

Sheet(15)

1- If the edge of a cube is 10cm. long , find its lateral area and its total area .

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2- Find the lateral area and the total area of a cube of edge 8cm. long .

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3- Find the total area of a cube whose face area is $49cm^2$.

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4- Find the lateral area of a cube whose lateral area is $48cm^2$.

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5- If the total area of a cube is $216m^2$. , find its lateral area .

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6- The sum of the lengths of the edges of a cube is 132cm. Find its lateral area , its total area and its volume .

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7- If the area of a circle is $616cm^2$. calculate its radius and circumference ($\pi = 22/7$) .

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The lateral area and the total area For each of cube and cuboid

** Second : The cuboid :

** The lateral area of a cuboid

= The perimeter of the base X the height .

** The height = $\frac{\text{The lateral area of the cuboid}}{\text{The perimeter of the base}}$

** The perimeter of the base

= $\frac{\text{The lateral area of the cuboid}}{\text{The height}}$

** The total area of the cuboid

= The lateral area + 2X (the area of the base)

** The total area of a cuboid without lid

= The lateral area + the area of one face .

Notes :

1- It has 6 faces , each face is a rectangle and each two opposite faces are equal in area .

2- It has 8 vertices and 12 edges .

3- It has 3 dimensions " length , width , and height " .

4- The area of one face = the area of the rectangle = length × width .

5- Its volume = length × width × height = base area × height .

Sheet(16)

1- A cuboid is 8cm. long , 7cm. wide and 5cm. height . Calculate its lateral area and its total area .

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2- Find the lateral area and the total area of a cuboid with square base of side length 10cm. , and height 12cm.

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3- The volume of a cuboid is $180cm^3$. and the dimensions of its base are 5cm. , 1.2dm. Find its total area .

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4- The cuboid - shaped box of atruch with inner dimensions 4 , 2.5 and 1 meters , is painted . if each square meter of the box to be painted costs L.E. 8 , calculate the painting cost .

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5- The inner dimensions of a swimming pool are 25 , 12 and 2.25 metres. It is necessary to cover its inner floor and sides with square - shaped ceramic tiles of side length 25cm. How many tiles are needed .

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6- Complete :

a) The lateral area of a cube = ……………..×……………..

b) The total area of a cube = ……………..×……………..

c) The edge length of a cube = 2cm. then its total area = ……..cm^2.

d) The lateral area of a cuboid = ……………..×……………..

e) The total area of a cuboid = ……………..+……………..

f) If the lateral area of a cuboid = 48cm^2. and the perimeter of its base = 24cm. , then its height = ……………..cm.

g) The base area of a cube is $36cm^2$. , then its lateral area is ....cm^2.

h) If the lateral area of a cuboid is $60cm^2$. , and its base area is $8cm^2$. , then its total area = ...cm^2.

i) The ratio between the area of one face of a cube and its lateral area = ...

j) The ratio between the total area of a cube and the area of one face = ...

k) If the volume of a cube = $125cm^3$., then the area of one its face = ...cm^2. , the perimeter of one of its faces = ...cm., its lateral area = ...cm^2., and its total area = ...cm^3.

l) If the lateral area of a cuboid = $140cm^2$. and the dimensions of its base are 2cm. and 5cm., then its height = ...cm.

m) The dimensions of a base of a cuboid are 4cm. and 3cm. and its lateral area = $140cm^2$., then its volume = ...cm^3.

n) A cube with out a lid of edge length 3cm., then its total area = ...

o) A cube - shaped box , without a lid , has ....faces .

p) The area of one face of the cube = ...its total area .

1- Complete :

a) The lateral area of a cuboid whose base dimensions are 3cm., 2cm. and its height is 4cm. equals ....

b) If the total area of a cube is 216cm^2., then the area of one face = ...cm^2.

c) The lateral area of a cuboid = ...

d) If the radius of circle is 7cm. , then its area = ...

e) If A (2 , 3) and B (4 , 3) , then AB = ...unit length .

f) The lateral area of a cube = ...

g) The image of the point (4 , -2) by translation (-1 , 3) is ....

h) The edge length of a cube is 8cm., then its total area = ...cm^2.

i) The circumference of a circle is 44cm., then length of its diameter is ....

j) If the total area of a cube is 726cm^2., then its lateral area = ...

k) The image of the point (3 , -2) by translation (X , Y) → (X , Y + 3) is ....

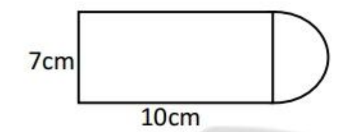
l) The image of the point (2 , -1) by translation of magnitude 3 units in the positive direction of Y-axis is ....

m) If the lateral area of a cube is 36cm^2., then its total area is ....

n) If the lateral area of a cuboid is 60cm^2. and its base area is 8cm^2., then its total area = ...cm^2.

o) The sum of the edge lengths of a cube is 72cm., then its lateral area = …………….cm^2.

q) The area of the opposite figure = …………….cm^2. (= $\frac{22}{7}$)



r) The total area of a cube is 150cm^2., then its edge length = …….

s) The area of one face of a cube = …………….its lateral area .

t) The area of the circle = ……………..

u) The area of one face of the cube is 1cm^2., then its lateral area = …………….cm^2.

v) A circle its circumference is 2 ▯ cm., then area = …………cm^2.

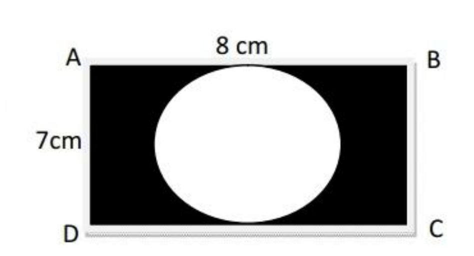
w) The lateral area of a cube = the area of one face X …………….

x) Two things must be known for the translation to happen ………………………………………………………………….

2- In the opposite figure :

ABCD is a rectangle whose length = 8cm. and its width = 7cm.,

find the area of the shaded part .



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3- In the opposite figure :

a) Determine the coordinates of the following points

A(……….,……….)

B (………. , ……….)

C(……….,……….)

b) Find the image of the Δ ABC by translation (X , Y) → (X + 2 , Y + 3) .

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c) The length of BC = ………. ,

the length of AB = ……….

d) Is the Δ ABC symmetric or not ?

4- The inner dimensions of a bath room are 2.4m. long , 2m. width and 3m. height . It is needed to cover its inner ground and sides with square-shaped ceramic tiles of side length 20cm. How many tiles are needed .

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5- Determine in the coordinate plane the following point A (-3 , 4) , B (1 , 4) , C (1 , 2) , then find :

a) The length of AB .

b) The length of BC .

c) The image of Δ ABC by translation (0 , -3) .

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6- A cuboid-shaped box without a lid , has a base with inner dimensions 1.2m , 1.7m. and height 70cm. It is wanted to cover it from inside with iron sheets that cost L.E. 10 per square metre . Find the cost of the iron sheets needed .

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7- Find the lateral area and the total area of a cube with edge length 3cm.

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8- A circle its circumference is 20π cm. Find its area .

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9- A cube of edge length 10cm. and a cuboids its length 8cm., its width 5cm. and its height 17cm. calculate the difference between their lateral areas .

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10- A box without a lid its length 16cm., its width 7cm., its height 19cm. Calculate its lateral area and total area .

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11- If the area of a circle is 113.04cm^2. Calculate its circumference (= 3.14) .

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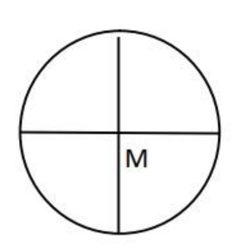
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12- In the opposite figure :

A circle M is divided Into four equal circular sectors , if the surface area of one sector is $346.5cm^2$. then calculate the circumference of the circle where .



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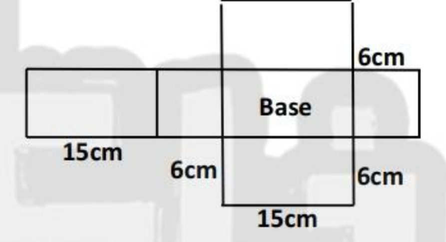
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13- When folding the opposite figure :

- The solid formed is ……….
- The lateral area of the solid = ……….
- The total area of the solid = ……….



14- A swimming pool-shaped a cuboid whose base is with dimensions 40m., 10m. and its height equal 2.5m. is needed to be covered by ceramic with square shape of side length = 25cm.

Find the number of boxes of ceramic is needed if each box contains 25 unit of ceramics .

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Model of Test on Unit 3

1- Complete :

a) The lateral area of a cuboid whose base dimensions are 5cm., 2cm. and its height is 8cm. equals ……………..

b) If the radius of circle is 14cm. , then its area = ……………..

c) If A (2 , 3) and B (4 , 3) , then AB = ……………..unit length .

d) The lateral area of a cube = ……………..

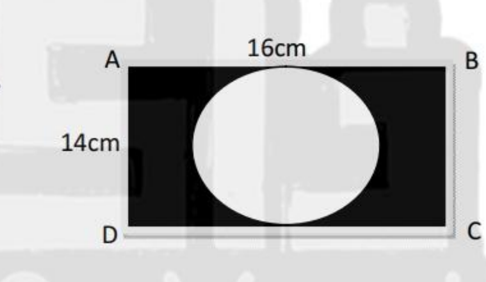
e) The image of the point (2 , -1) by translation of magnitude 2 units in the negative direction of X-axis is ……………..

2- In the opposite figure :

ABCD is a rectangle whose length = 16cm.

and its width = 14cm.,

find the area of the shaded part .



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3- If the area of a circle is 113.04cm^2. Calculate its circumference (= 3.14) .

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5- Determine in the coordinate plane the following point A (-3 , 4) , B (1 , 4) , C (1 , 2) , then find :

a) The length of $\overline{AB}$.

b) The length of $\overline{BC}$.

c) The image of Δ ABC by translation (0 , -3) .

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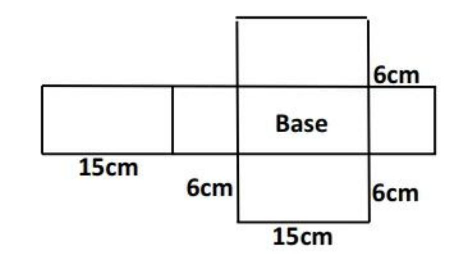
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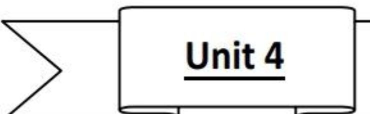
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5- When folding the opposite figure :

- The solid formed is ....
- The lateral area of the solid = ...
- The lateral area of the solid = ...





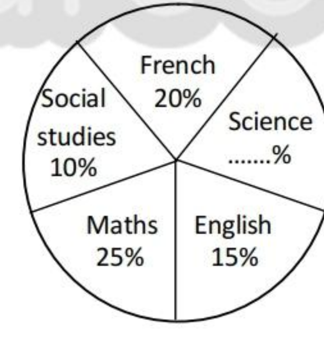
Representing the statistical data by using the circular sectors

Notes :

- The circular sector : It is a part of the surface of the circle bounded by an arc and two radii passing through the end points of this arcs.
- Each circular sector has an angle whose vertex is the centre of the circle which is called a " central angle " .
- The sum of the measures of angles accumulating a round the centre of the circle is equal to 360° .

Sheet (17)

1- The opposite figure shows the percentages of the sales of different types of books . Complete :



a) The sales percentage of science book is ....

b) The least sales percentage is in ....

c) The ascending order of books types according to the percentage of sales is .... , ... , ... , ...and..........

2- The following table shows the percentage of the production of four factories :

Factory	First	Second	Third	Fourth
Percentage	35%	15%	20%	30%

- Represent these data by a pie chart .



3- The monthly income of a family is L.E. 1200 , the family spends 25% of its in come on rent , 50% on food , 15 % on others and saves the rest .

a) Represent these data using pie-chart .

b) Find the capital which this family saves monthly .



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4- The following table shows the number of hours that marks spent in the revision of different subjects during a week :

Subject	Arabic	English	Maths	Science	S .studies	O subjects
The no. of hours	6	6	7	6	4	9

- Represent this data by a pie chart .

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The random experiment

- **The random experiment** :

It is an experiment in which we can determine all its possible outcomes before carrying it out , but we can't predict in certainly which of these out comes will occur when the experiment is carried out .

- **Sample space (out comes space)** :

It is a set of all possible outcomes for a random experiment and it is usually denoted by the symbol (s) and the number of all elements of the sample space is denoted by n(s) .



1- Determine the sample space of each of the following random experiments , showing the number of its elements .

a) Choosing a card from 5 cards numbered from 3 to 7 and observing the written digit on the card .

b) Choosing one of the digits of the number 23791 .

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2- A bag contains 4 equal cards having the same colour and numbered from 30 to 33 write the sample space for this experiment .

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3- From the set of digits { 3 , 4 , 5 } , a number is formed from two digits . Determine the sample space of this experiment showing the number of its elements .

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The probability

- The event :

It is a subset of the sample space .

- The probability of the event :

$$P(A) = \frac{\text{The number of elements of A}}{\text{The number of element of S}} = \frac{n(A)}{n(S)}$$

Notes :

1- The probability of the impossible even = zero .

2- The probability of the certain event = 1 .

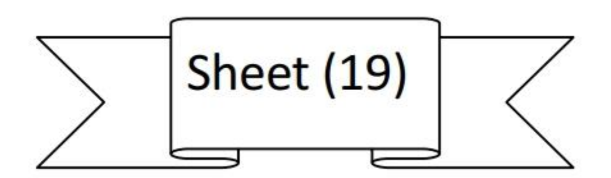
3- The probability of the possible event = proper fraction

(between zero and 1) .

4- The sum of probabilities of all out comes of random experiment = 1 .

5- If the probability of occurrence of an event A is P(A) , then the

probability that it doesn't occur = 1 – p(A) .



1- **Complete** :

a) The probability of the impossible event = ...and the probability of the certain event = ...

b) For every event A , we find that ....≤ P(A) ≤ ....

c) If a fair coin is tossed once , then the probability of a appearance of a head = ...

d) If the probability of the occurrence of an event is $5/8$, then the probability of the non-occurrence of this event is ....

2- If a fair die tossed one , what is probability of each of the following events :

a) Appearance of a number greater than 2 = ...

b) Appearance of a number less than 3 = ...

c) Appearance of an even number = ...

d) Appearance of the number 7 = ...

e) Appearance of the number 6 = ...

f) Appearance of number less than or equal 6 = ...

g) Appearance of a prime number 2 = ...

h) Appearance of the number 5 or the number 6 = ...

i) Appearance a number between zero and 10 = ...

j) Appearance a number divisible by 3 = ...

3- A box contains 25 balls (4 balls are yellow , 7 balls are red and the remainder is black) If a ball is drawn randomly , find the probability that drawn ball is :

a) Black . = ………………………………

b) Yellow or red . = ………………………………

c) not green . = ………………………………

d) Neither black nor yellow . = ………………………………

4- Drawing randomly a coloured marble out of a box containing 12 red marbles , 18 white marbles and 20 blue marbles . Find the probability of selecting :

a) A white marble . = ………………………………

b) A yellow marble . = ………………………………

c) A non-red marble . = ………………………………

d) A red or blue marble . = ………………………………

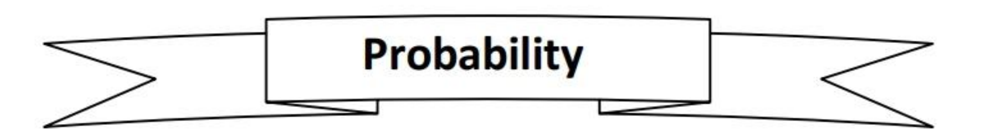
5- The set { 2 , 3 , 5 } is used in writing a 2-digit number . Find the probability of the following events :

a) The tens digit is odd . = ………………………………

b) The units digit is even . = ………………………………

c) The sum of the two digits is 7 .= ………………………………

d) The two digits are equal . = ………………………………



1- Complete :

a) A box contains 5 white balls , 3 blue balls and 8 red balls , all balls are identical , if a ball is chosen randomly , then the probability that the chosen ball is not red = ……………….

b) A basket contains 15 balls numbered from 1 to 15 , if one of the balls is chosen randomly then the probability that the chosen ball carried a prime number = ……………….

c) The probability of the impossible event = and the probability of the certain event = ……………….

d) In an experiment of throwing a fair die , the probability of getting a number more than 5 is ……………….

e) A box contains 48 oranges , 4 of them are bad . If we draw an orange at random , then the probability that the drawn orange is not bad = ……………….

f) In the competition for selecting the ideal student in one of the school 45 students participated . If the probability that the chosen student is equal $4/9$, then number of girls participated this competition = ……………….

g) As choosing a letter randomly from the letters of the word [Eslam] , the probability of choosing the letter (M) = ………...

h) If the probability of the occurrence of an event is $5/8$, then the probability of the non-occurrence of the event is ……………….

i) The sample space of the random experiment of tossing two distinct coins once is ....

j) If a fair die is thrown once , then the probability of getting an even number less than 4 is ....

k) If a fair coin is tossed once , then the probability of appearance of a head = ...

l) The sample space of the random experiment of getting 2-digit number using the digit 2 , 3 , 4 is ....

m) 10 cards numbered from 1 to 10 . If a card is drawn randomly , then the card is numbered by a prime number = ...

2- **Choose the correct answer** :

1) Ahmed is a pupil . In his class , there are 36 pupils . 16 of them are girls . If a pupil is selected randomly , what is the probability that the pupil is a boy ?

a) $4/9$ b) $1/2$ c) $5/9$ d) $1/36$

2) The sum of the measures of the angles a round the center of the circle = ...

a) 90° b) 108° c) 180° d) 360°

3) The measure of the circular sector whose area represent $1/8$ from the area of the circle = ...

a) 30° b) 45° c) 60° d) 90°

4) If the probability of success of a student is 70% , then the probability of his failure = ...

a) 3% b) 0.3 c) 0.03 d) 0.7

5) The measure of the angle for the sector of quarter of circle is ....

a) 30° b) 45° c) 60° d) 90°

6) If a die tossed once then the probability of getting a number satisfies the inequality $3 \le X \le 4$ equals ……………

a) $1/3$ b) $1/2$ c) $1/6$ d) 0

7) A regular coin is tossed 1000 times then the most expected number to get head equal …………….

a) 496 b) 503 c) 600 d) 999

8) Which of the following may be the probability of an event ?

a) 1.2 b) -0.4 c) 315% d) 75%

9) If a die is rolled once then the probability of getting a number > 6 is …………….

a) ϕ b) zero c) $1/6$ d) $1/3$

3- A bag contains 25 balls (4 balls are yellow , 9 balls are red and the remainder is black) if a ball is drawn randomly , find the probability that the drawn ball is …………….

a) black . = …………………………………………
b) not black . = …………………………………………
c) brown . = …………………………………………
d) yellow or black . = …………………………………………

4- The following table shows the percentages of oil product if 4 factories.

Factory	1^{st}	2^{nd}	3^{rd}	4^{th}
Percentage	35%	15%	20%	30%

Represent these data by a pie chart .

5- The following table shows the percentages of production of a factory for three kinds of electric water heaters .

The kind	First	second	third
An angle			
% of the production	55%	....	15%

a) Complete the table .

b) Represent the data by circular sectors .

c) If the total production in the factory is 2000 heater , find the number of heaters of the second type .



6- One of the families spends its salary as the following 40% for food , 30% for expenses , 20% for house rent and save the remainder represent these data by using the circular sectors , then answer the following :

If the family monthly in come is L.E. 900 , so how much does the family save in the year ?

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Model of Test on Unit 4

1- **Complete** :

a) The sample space of the random experiment of getting 2-digit number using the digit 2 , 3 , 4 is ....

b) 10 cards numbered from 1 to 10 . If a card is drawn randomly , then the card is numbered by a prime number = ...

c) If the probability of the occurrence of an event is $\frac{5}{8}$, then the probability of the non-occurrence of the event is ....

d) In the competition for selecting the ideal student in one of the school 45 students participated . If the probability that the chosen student is equal $\frac{4}{9}$, then number of girls participated this competition = ...

e) A box contains 5 white balls , 3 blue balls and 8 red balls , all balls are identical , if a ball is chosen randomly , then the probability that the chosen ball is not red = ...

2- **Choose the correct answer** :

1- Ahmed is a pupil . In his class , there are 36 pupils . 16 of them are girls . If a pupil is selected randomly , what is the probability that the pupil is a boy ?

a) 4/9 b) 1/2 c) 5/9 d) 1/36

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2- The sum of the measures of the angles a round the center of the circle = ...

a) 90° b) 108° c) 180° d) 360°

3- The measure of the angle for the sector of quarter of circle is ....

a) 30°   b) 45°   c) 60°   d) 90°

4- Which of the following may be the probability of an event ?

a) 1.2   b) -0.4   c) 315%   d) 75%

5- If a die is rolled once then the probability of getting a number > 6 is ....

a) ϕ b) zero   c) $\frac{1}{6}$ d) $\frac{1}{3}$

3- A bag contains 25 balls (4 balls are yellow , 9 balls are red and the remainder is black) if a ball is drawn randomly , find the probability that the drawn ball is :

a) black .   = ...

b) not black .   = ...

c) brown .   = ...

d) yellow or black . = ...

4- The following table shows the percentages of production of a factory for three kinds of electric water heaters .

The kind	First	Second	Third
The percentage Of the production	55%	……..	15%

e) Complete the table .

f) Represent the data by circular sectors .

g) If the total production in the factory is 2000 heater , find the number of heaters of the second type .

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